Volunteer Lake Assessment Program Individual Lake Reports

PAWTUCKAWAY LAKE, NOTTINGHAM, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	13,248	**Max. Depth (m):**	15.2	**Flushing Rate (yr^{-1}):**	2.3
Surface Area (Ac.):	900	**Mean Depth (m):**	2.9	**P Retention Coef:**	0.61
Shore Length (m):	27,700	**Volume (m^3):**	10,740,000	**Elevation (ft):**	250

TROPHIC CLASSIFICATION

Year	Trophic class
1989	MESOTROPHIC
1998	MESOTROPHIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the 2012 305(b) report on the status of N.H. waters, and are based on data collected from 2001-2011.

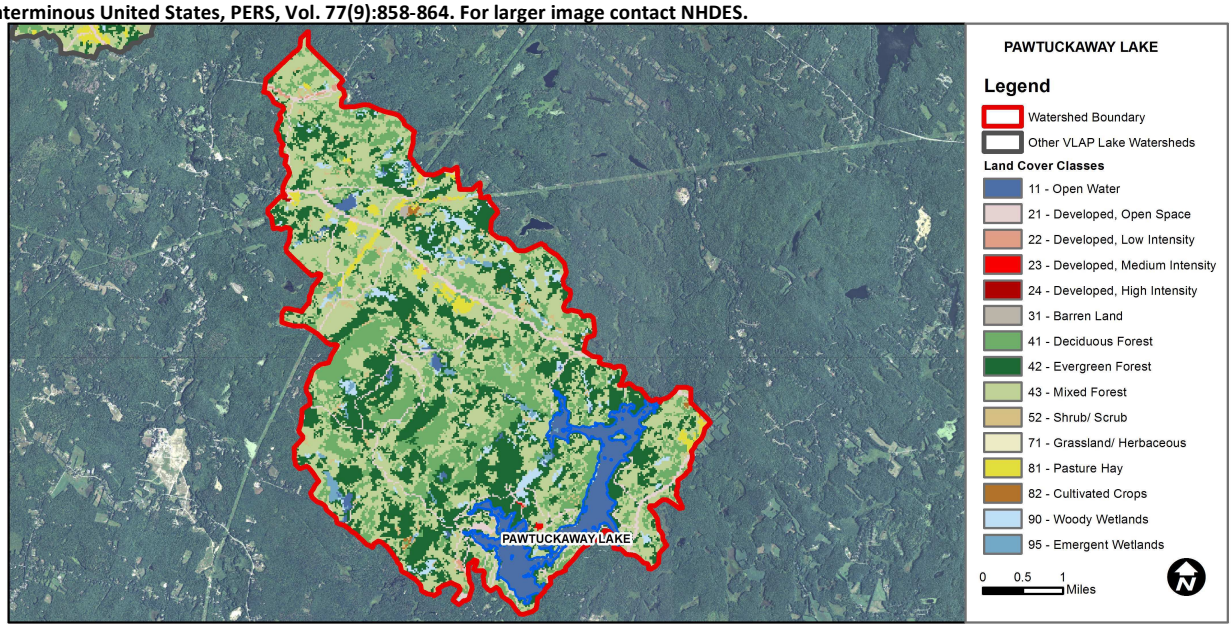
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Slightly Bad	>/=5 samples and median is >threshold.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	D.O. (mg/L)	Good	At least 10 samples with 1 sample but < 10% of samples exceeding criteria.
	D.O. (% sat)	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Chlorophyll-a	Slightly Bad	>5 samples and median is > threshold.
Primary Contact Recreation	E. coli	No Data	No Data for this parameter.
	Cyanobacteria	Slightly Bad	Cyanobacteria bloom(s).
	Chlorophyll-a	Good	At least 10 samples with 1 sample but < 10% of samples exceeding criteria.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

PAWTUCKAWAY LAKE - TOWN BEACH	E. coli	Bad	>/=1 exceedance(s) of geometric mean criterion and/or >/=2 exceedances of single sample criterion, with 1 or more >2X criteria.
PAWTUCKAWAY LAKE - PAWTUCKAWAY STATE PARK BEACH	E. coli	Bad	>/=1 exceedance(s) of geometric mean criterion and/or >/=2 exceedances of single sample criterion, with 1 or more >2X criteria.
PAWTUCKAWAY LAKE - PAWTUCKAWAY STATE PARK BEACH	Cyanobacteria	Slightly Bad	Cyanobacteria bloom(s).

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



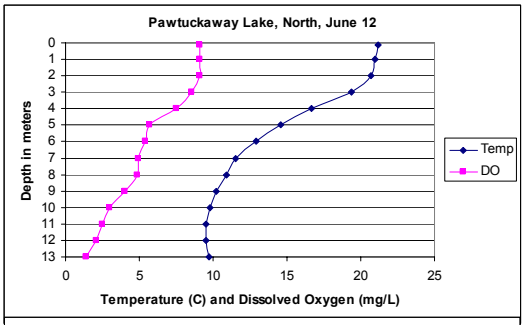
Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	6.52	Barren Land	0.09	Grassland/Herbaceous	0.06
Developed-Open Space	4.12	Deciduous Forest	16.26	Pasture Hay	1.5
Developed-Low Intensity	0.19	Evergreen Forest	26.59	Cultivated Crops	0.16
Developed-Medium Intensity	0.05	Mixed Forest	38.87	Woody Wetlands	3.15
Developed-High Intensity	0.02	Shrub-Scrub	1.49	Emergent Wetlands	0.92

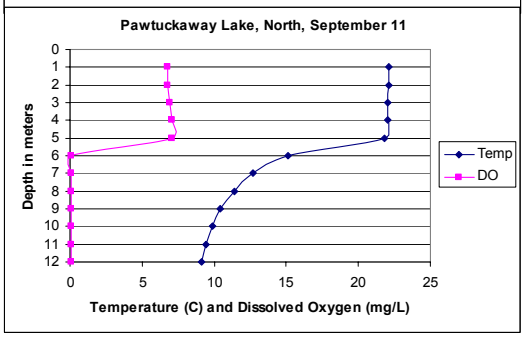
VOLUNTEER LAKE ASSESSMENT PROGRAM INDIVIDUAL LAKE REPORTS
PAWTUCKAWAY LAKE, NORTH STN, NOTTINGHAM, NH
2012 DATA SUMMARY

OBSERVATIONS AND RECOMMENDATIONS (*Refer to Table 1 and Historical Deep Spot Data Graphic*)

- **CHLOROPHYLL-A:** Chlorophyll levels were above the NH lake median for all months except June, however decreased slightly from 2011. Historical trend analysis indicates chlorophyll levels have significantly increased (worsened) since monitoring began.
- **CONDUCTIVITY/CHLORIDE:** Conductivity levels were elevated in Fernalds Bk. due to agricultural activities and slightly elevated in White Grove Brook.
- **TOTAL PHOSPHORUS:** Epilimnetic (upper water layer) phosphorus levels were relatively stable throughout the summer and average levels were greater than the NH lake median. Historical trend analysis indicates a significantly increasing (worsening) epilimnetic phosphorus level since monitoring began. Hypolimnetic (lower water layer) phosphorus levels increased as the summer progressed due to low oxygen levels and release of phosphorus from lake sediments. Phosphorus levels in Fernalds Bk. were greatly elevated again due to historic agricultural activities. Fundy Bk. phosphorus appears to be decreasing slightly since monitoring began, which is a good sign.
- **TRANSPARENCY:** Transparency was greater than the NH lake median. Volunteers switched to utilizing only the viewscope method to measure transparency (2007-2012); therefore we need at least ten consecutive years of data to conduct a statistical trend analysis of viewscope transparency data.
- **TURBIDITY:** Hypolimnetic turbidity was generally elevated throughout the summer due to natural processes. Fundy Bk. turbidity was elevated in June likely due to sediment from low water levels.
- **PH:** Deep spot pH levels decrease to undesirable levels towards the lake bottom. Fundy Bk. pH levels were much lower than other tributaries.
- **RECOMMENDED ACTIONS:** To offset the internal phosphorus load from the hypolimnion, focus efforts on minimizing the phosphorus load from the surrounding watershed. Educate watershed residents on ways to reduce phosphorus loading from their properties through do it yourself stormwater management projects. Continue working with agricultural facilities on ways to reduce phosphorus loading to Fernalds Brook. Keep up the great work!

Dissolved Oxygen & Temperature Profile





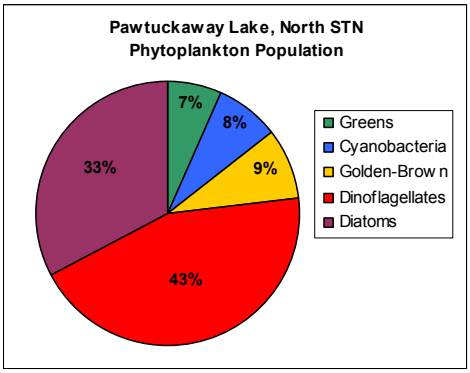


Table 1. 2012 Average Water Quality Data for PAWTUCKAWAY LAKE, NORTH

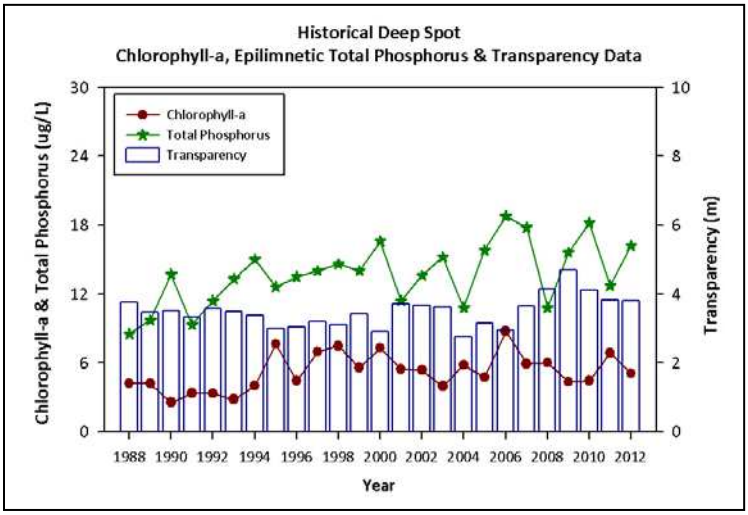
Station Name	Alk. mg/l	Chlor-a ug/l	Cond. uS/cm	Total P ug/l	Trans. m NVS	Trans. m VS	Turb. ntu	pH
#09 Fernalds B			350.5	2050			2.74	6.74
Back Creek B			46.1	31			1.06	6.46
Fernalds A			171.8	427			1.52	6.84
Fundy Brook			47.1	25			4.91	5.07
North Epilimnion	5.12	5.06	46.3	16	3.50	3.79	1.02	6.70
North Metalimnion			47.7	17			1.12	6.06
North Hypolimnion			55.3	58			5.28	6.12
Round Pd Brook			33.8	19			1.00	6.29
White Grove Brook			99.4	22			0.78	6.17

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: < 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: 6.5-8.0 (unless naturally occurring)

HISTORICAL WATER QUALITY TREND ANALYSIS

Parameter	Trend	Explanation
Chlorophyll-a	Degrading	Data significantly increasing (worsening).
Transparency	N/A	Additional viewscope data necessary to determine trend.
Phosphorus (epilimnion)	Degrading	Data significantly increasing (worsening).



This report was generated by the NH DES Volunteer Lake Assessment Program (VLAP). For more information contact:
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